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Ms. Louise Rickard
Acting Executive Secretary
Department of Public Utility Control
10 Franklin Square
New Britain, CT 06051

DOCKET 03-01-15: DPUC Investigation into the Need for Interconnection Standards for Distributed Generation

INTRODUCTION

Aegis Energy Services has been in the business of developing small cogeneration (combined heat and power--CHP) systems throughout New England for the past 17 years. We provide economic analysis, engineering, installation, service, and optional ownership with shared savings agreements as a financing vehicle. Aegis primarily uses the Tecogen product, originally developed by Thermo Electron of Waltham, MA.

These natural gas fired units have an overall efficiency of 84% and are commonly used to provide heat for space heating, domestic hot water, pools, and other processes. The machine utilizes an induction generator which operates as a slave unit to the utility power system which controls its voltage and frequency. It cannot sustain operation without power for the magnetizing field from the utility. Its electric characteristics are similar to an induction motor, as opposed to a synchronous generator which develops its own magnetic field and is normally used for standby and emergency power systems.

The interconnection is simple. The system is connected directly to the customer's electric system. There are no transfer switches and it is always in synch with the utility. Because of its electrical simplicity, the units are easily connected to buildings electrical systems and could represent a significant source of power in metropolitan areas with electrical congestion.

Our cogeneration systems are typically used in nursing homes, apartment buildings, hospitals, YMCAs, JCCs, and other facilities where thermal loads are extensive. These systems are primarily used for their thermal benefits, but are capable of rejecting the recovered heat with the use of dump radiators so that the machine may continue to provide electricity for the customer during summer peak times. The engine driving the generator uses the same fuel that would normally be used in the boilers while producing electricity. The heat from the engine is recovered and used to meet the thermal requirements of the facility.

We wish to submit the following responses to the questions posed by the DPUC in this docket.

1) *The benefits and detriments to the transmission and distribution systems of small generator interconnections with electric distribution systems, and whether such interconnections should be encouraged, particularly in Southwest Connecticut;*

   The most notable benefit of distributed generation (DG) to the utility's transmission and distribution system is that it reduces the need for costly transmission and distribution system upgrades. This is particularly important in Southwest Connecticut, where there is currently a great deal of congestion and compatible solutions are hard to come by. In this way and as a competitor to utility power supply, DG keeps the "lid" on utility rates.

2) *The technical issues that must be considered by the distribution company to accommodate a small generator interconnection, both at the interconnection itself and elsewhere in the transmission and distribution systems, including specific design characteristics and features of such systems that may encourage or discourage small generator interconnections;*

   The technical issues the utility would need to address vary based on the size and type of machine. There are many more safety and reliability concerns with larger systems, and therefore, more significant technical issues. "Small", as defined by FERC, has an extensive range. Perhaps a category of "mini" might be used for systems in the range of 300 to 500 kW or below. The impact of "mini" systems on the utility systems is insignificant. Induction generators present no techincial issues, as they run parallel to the utility system, shutting down when there is a problem. In fact, in spite of being notified of interconnection, the utilities have lost track of many of the machines currently on their systems. In comparison, synchronous generators of any size involve significant technical issues.

3) *The steps that are typically followed by a distribution company to accommodate a small generator interconnection, and the length of time and resources required to study and approve a typical interconnection;*

   Until recently, most utilities recognized the benign electrical characteristics of induction generators. Upon notification, many of these projects were allowed to proceed with no obstacles ("fast track"). At the most, minor functional operations tests were requested and performed for some projects. In recent years,

Connecticut Light and Power (CL&P) has waived some unnecessary requirements for induction generator interconnections.

4) *The extent to which utility interconnection practices and policies encourage or discourage small generator interconnections, including specific examples of such policies and practices of distribution companies in Connecticut;*

UI has employed tactics to discourage interconnection. After approving a written request for a breaker installation, UI then changed its mind and threatened to shut down the power to the facility if an additional disconnect was not used. The Connecticut State Codes and Standards Committee later ruled that these switches were not necessary for induction generators as related to the National Electric Code.

In addition, UI has utilitized various funds collected from ratepayers to discourage the conservation of energy through CHP.

5) *Specific instances where small generators have been considered in Connecticut, but discouraged by interconnection requirements of the electric distribution companies;*

A microturbine system at a public school facility in Bridgeport was removed because of utility compliance issues.

6) *The extent to which utility rate structures encourage or discourage small generator interconnections, including identification of the subject rates and recommendations for changes to such rates;*

In the last 20 years, there has been an effort to discourage small generator interconnections through a pattern of high demand charges and low energy charges (a reversal of the rates in prior years), such that the occasional outage of a DG system results in a significant loss of savings, reducing the overall economics of the installation and therefore discouraging these small systems. This shift in rate structure discourages conservation—it doesn't pay to "shut off your lights" because demand charges represent a substantial portionof the invoice.

In addition, the misapplication of backup service rates to small customers has had a chilling effect on the development of DG (docket 02-02-06).

Time-of-Day rates are also discouraging to DG. Many of these small systems only generate a portion of the customer's on-peak load—the same time period that the utilities use for their cost recovery with high rates. The generation of electricity during the offpeak period yields marginal returns.

Ideally, the charges of a time of use rate should be more evenly distributed between the different time periods. It is understood that the theory behind the significant differences in the pricing was intended as a signal to the customers, with the intention that customers would displace their load to the less expensive time periods. Realistically, however, there are very few cases where a commercial

customer can displace their load. Inappropriately low priced off peak rates further serve to discourage conservation in that the effect on the bill is hardly noticeable.

The use of seasonal rates, however, should be encouraged because it sends the appropriate signals to the customer regarding the cost of electric air conditioning. Rates that use a ratcheted demand structure hide the fact that you are paying a higher rate for summer electric use by spreading the charges out through the entire year. Those customers are not getting the right "signal".

7) *A list of industry standards that are applicable to a small generator interconnection that the Department should consider for inclusion in the promulgation of any technical requirements for interconnections, and comments regarding the advantages and disadvantages of adopting such standards, particularly those of the Institute of Electrical and Electronics Engineers;*

IEEE 1547 is the standard commonly being referred to these days. We see no reason why this standard shouldn't be used as a reference, however we would like to make note of thefact that it is all-inclusive. If small generators are held to all of the requirements identified in this document, many of which are comparable to the standards required for central station power plants, it would drive up the costs of installing these small systems.

8) *The extent to which distribution company metering practices encourage or discourage small generator interconnections, including identification of such metering practices in Connecticut;*

If applicable, UI's rate NUS for backup and/or maintenance service would require costly metering and would include a continous service charge.

9) *Identification of environmental and permitting requirements that discourage small generator interconnections, and how such requirements can be reasonably changed to expedite such interconnections;*

Recent changes by the Connecticut Department of Environmental Protection appear to be intended to encourage the use of small generation systems.

10) *How wholesale pricing and allocation issues (e.g. locational marginal pricing) encourage or discourage small generator interconnections;*

Any mechanism such as locational marginal pricing that increases the cost of electricity will encourage DG. In turn, the increased implementation of DG in these areas will result in lower congestion levels, eventually reducing the need for such mechanisms in the first place.

11) *The feasibility of establishing a "fast track" small generator interconnection approval process, wherein certain interconnections that do not significantly affect the operation of an electric distribution company's distribution system could be rapidly approved; and*

It is absolutely feasible to establish a "fast track" interconnection approval process. Other states already implement such procedures, which are typically based on

whether or not the equipment being installed is certified. The “fast track” should recognize generators by size and type.

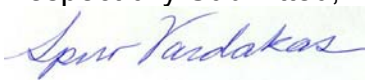
12) *Incentives that currently exist and incentives that the State of Connecticut and the Department should consider to promote the interconnection of small generators.*

We cannot identify any incentives that currently exist in Connecticut. However, the conservation monies currently being collected by the utilities would be well spent if used to promote highly efficient CHP systems. The incentive would be justified by the fact that these smaller systems will help the utilities avoid investment in new transmission and distribution equipment, and through this, help maintain lower rates for all customers.

Incentives should also be given for customers who choose absorption cooling in conjunction with CHP. While these systems are capital intensive, the use of thermally-driven cooling reduces the need for electrically-driven air conditioning, which in turn reduces the congestion on utility lines during the summer peak period. The use of conservation monies for even high-efficiency electric air conditioning should be discouraged.

We appreciate the opportunity to provide comments on these matters.

Respectfully Submitted,



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